1,108,995

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,108,995

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Int. Cl.:—B 65 d 75/30.

COMPLETE SPECIFICATION

A Method for Packing Compressible Material, Device therefor and Package made thereby

We, AB DUPLAN, of Wallingatan 30, Stockholm C, a Swedish Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a method for packing compressible material, e.g. pieces or cubes of foam plastic or rubber, and to a device therefor and to a package formed thereby.

Up till now it has been customary to market material of the above-stated kind loosely packed in bags of plastic or similar material. Such packages are very bulky and most difficult to store, as on account of their form they cannot be stacked and as the bags are easily damaged because of their soft content.

Attempts have been made to exhaust the air from a bag filled with material, but the results have not been satisfactory as the suction which can be applied in this way is not sufficient to remove the air enclosed in the pores of the material, so that the improvement in the package is negligible. Also the light pieces of material are sucked out of the bag by the air stream and the measures that must be taken to prevent this are complicated and expensive.

It is an object of the present invention to overcome these disadvantages and to provide a method for packing such compressible material to yield a package which has the form of a flat, compact disc. Such a package only requires a fraction of the storage space needed for packages made by previous methods, is easy to stack and to store and is not very easily punctured.

According to the invention there is provided a method for packing compressible material that regains substantially its original volume on release from compression for instance pieces of foam plastic or rubber said method comprising placing the material in a tubular container open at both ends, placing foils over the material at opposite ends of the container, compressing the material within the container so as to displace the foils towards one another, the container constraining the material against sideways movement, and directly joining the edges of said foils together on all sides of said material while it is retained in compressed condition.

A suitable method of joining the foils is by welding. Suitable foils are e.g. vinyl foils.

In order that the invention may be more clearly understood an embodiment of the method according to the invention and an embodiment of a device according to the invention for practicing said method are described below purely by way of non-limiting example and with reference to the accompanying drawings in which: Figs. 1 to 6 show diagrammatically in vertical cross-section an embodiment of a device according to the invention at six consecutive working stages in the production of a package.

Referring now to the drawings the device comprises a press table 1 carrying a frame 2 with the same contour as the package to be produced. A foil 3, e.g. a vinyl foil, is placed over said frame and said foils is of such a size that the edges thereof extend somewhat outside of the outer borders of the frame 2.

A tubular member 4, the outer contour of which corresponds to the inner form of said frame 2 and fits into same with some clearance, is lowered by elevator member 8 on to the foil 3. The tubular member 4 is open at both ends so that it forms a sort of shaft of which the foil 3 forms the bottom. The shaft 4 is filled with the material 5 to be

[Price 4s. 6d.]

packed, said material preferably being introduced loosely so that the volume of the shaft 4 corresponds to the amount of material to be packed into each package. Another foil 6, of substantially the same size as the foil 3 is loosely placed on the top edge of the shaft 4.. This condition is shown in Fig. 1.

After the foil 6 has been arranged in position on the top edge of the shaft 4, a press plate 7 is moved down towards the lower foil 3 and forces the foil 6 down into the shaft 4, mechanically compressing the material 5 in the shaft 4. The working stroke of the press plate 7 is preferably accomplished by means of a hydraulic ram and the walls of the shaft 4 can, if desired, be provided with small bores or openings to facilitate the escape of air from between the foils. Sufficient clearance is provided between the edges of the press plate 7 and the walls of said shaft 4 so that the foil is not damage in its movement down towards the press table 1.

When said press plate 7 arrives in its lowermost position as shown in Fig. 2, which position determines the compression of the material and the size of the resulting package, it is arrested and as shown in Fig. 3, the shaft is lifted a certain distance relatively to said press table 1 and said press plate 7 by means of the elevator member 8 which preferably is lowered down towards the top edge of said shaft similtaneously with the lowering of said press plate 7. By lifting the shaft 4 while press plate 7 retains the top foil 6 and the material compressed between itself and the bottom foil 3, the edges of the top foil 6 are released so that it can fall down on the edges of the bottom foil 3, the edges of the top foil 6 having been folded upwards between the press plate 7 and the walls of the shaft 4 during the movement of the press plate 7 down into the shaft 4. To facilitate the release of the foil edges, the edges of the press plates are chamfered upwardly inwards as shown at 9.

Simultaneously with the lifting of the shaft 4, a frame 10 is lowered, which frame encloses the shaft 4 with a relatively large clearance. The frame 10, which preferably consists of angle irons connected to one another and having one horizontal flange and one vertically depending flange, carries a number of welding electrodes 11 which during the lowering of the frame 10 are brought into abutment with and press the free edges of the top foil 6 and the edges of the bottom foil 3, against the frame 2 of the press table 1 (see Fig. 4). The frame 2 acts as a counter electrode and thus the edges of the two foils 3 and 6 are welded together between the frame 2 and the electrodes 11. After a suitable delay to allow the welding seam to set in a satisfactory manner, both the press plate 7 and the frame 10 with the electrodes 11 are returned to their initial positions while the completed package 12 remains on the press table, as shown in Fig. 5. Both the time of the welding and the duration of the delay are preferably adjustable for adaptation to different foil materials and foil thicknesses.

Thereafter the package 12 is removed and the lifting means 8 again lowers the shaft 4 at the same time as a new foil 3 is placed on top of the frame 2 (see Fig. 6) whereafter the working cycle of the device can be repeated.

Since the material is subjected to a mechanical compression the air contained in its pores can easily be expelled so that a high compression can easily be accomplished, a given amount of material thereby occupying very little space after the packing. Due to the fact that compressed material offers a very much greater resistance than loose material, the enclosing foils are not so easily damaged as bags surrounding loose material, so that the new package is considerably less fragile than previously known packages.

The displacement of the members contained in the device is preferably effected by means of hydraulic jacks, although other driving means can be used. The device can easily be arranged for automatic operation so that the working movements of the different members are synchronized. The foils can also be placed automatically, e.g. by unwinding them from supply rolls and by cutting off suitable pieces when they have been pulled into their correct positions. The material to be packed can also be introduced automatically into the tubular member or shaft 4. Construction of such automatic control means are per se well understood by the epxert; accordingly they are not further described or shown.

WHAT WE CLAIM IS:—

1. A method for packing compressible material that regains substantially its orginal volume on release from compression, for instance pieces of foam plastic or rubber, said method comprising placing the material in a tubular container open at both ends, placing foils over the material at opposite ends of the container, compressing the material within the container so as to displace the foils towards one another, the container constraining the material against sideways movement, and directly joining the edges of said foils together on all sides of said material while it is retained in compressed condition.

2. A method as claimed in claim 1, wherein said material is introduced in uncompressed condition into a tubular member or shaft which is open at both ends and

resting with one open end on a firmly supported one of said foils, a second foil is placed over the other said open end of said tubular member or shaft and is mechanically forced down into said tubular member or shaft to compress said material between said two foils.

3. A method as claimed in claim 1 or 2, wherein said material is introduced in uncompressed condition into a tubular member or shaft which is open at both ends and resting with one open end on a firmly supported one said foil; a second foil is placed over the other said one open end on a firmly supported one said foil; a second foil is placed over the other said open end of said tubular member or shaft and is mechanically forced down into said tubular member or shaft to compress said material between said two foils; and said tubular member or shaft is withdrawn from the edge of said second foil prior to joining said edges of the foils.

4. A method as claimed in any of claims 1 to 3, wherein said joining is effected by welding.

5. A method as claimed in any of claims 1 to 4, wherein said foils are of vinyl plastic.

6. A device for packing compressible material according to the method claimed in any of claims 1 to 5, comprising a press table forming a support for a first foil, a tubular member or shaft, open at both ends and arranged to be able to rest with its bottom edge on said first foil and to contain an amount of material to be packed, a press plate which is movable down into said tubular member or shaft with sufficient clearance from the walls thereof to enable a second foil arranged over said tubular member or shaft to be forced down into the latter while compressing said amount of material therein, and means for welding the edges of said two foils to each other.

7. A device as claimed in claim 6, wherein said means for joining the edges of said two foils comprises a carrier, which is displaceable towards said press table while surrounding said tubular member or shaft and which carries welding electrodes arranged to press the edges of said two foils together on said press table and to weld said edges to each other.

8. A device as claimed in claim 6 or 7, wherein said means for joining the edges comprises a frame supported on said press table.

9. A device as claimed in claim 6, 7 or 8, comprising an elevator member for lowering and lifting said tubular member or shaft.

10. A device as claimed in any of claims 6 to 9, wherein the edges of said press plate are chamfered upwardly inwards to facilitate release of the edges of said second foil.

11. A device as claimed in any of claims 6 to 10, wherein the walls of the tubular members or shaft are provided with small bores or openings to facilitate escape of air from between the foils.

12. A device as claimed in any of claims 6 to 11, wherein both the time of welding and the duration of a subsequent delay in the working cycle for allowing the weldnig seam to set are adjustable.

13. A device as claimed in any of claims 6 to 12, including automatic controls for the movements of the moving members.

14. A package of compressible material that regains substantially its original volume on release from compression for instance pieces or cubes of foam plastic or rubber, said package comprising two foils the edges of which are directly joined together and enclose a mechanically compressed amount of the material, packed by a method as claimed in any of claims 1 to 5.

15. A method substantially as herein-before described with reference to the accompanying drawings.

16. A device substantially as herein-before described with reference to the accompanying drawings.

17. A package substantially as herein-before described with reference to the accompanying drawings.

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1,108,995 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

FIG. 1

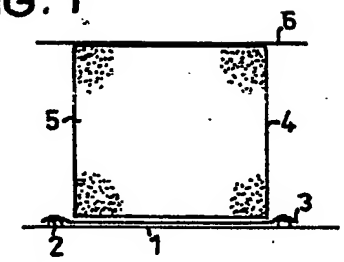
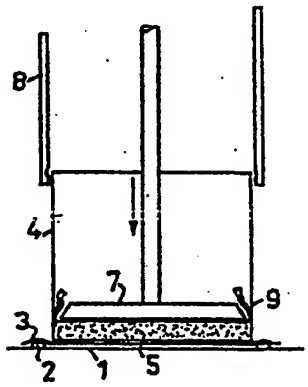


FIG. 2



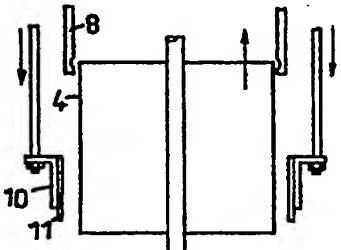


FIG. 3

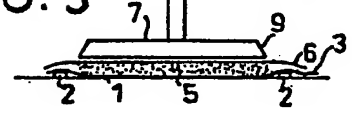


FIG. 4

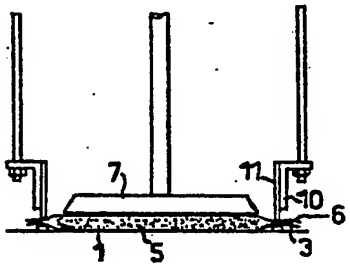


FIG. 5

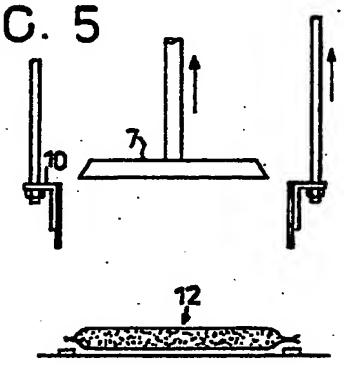
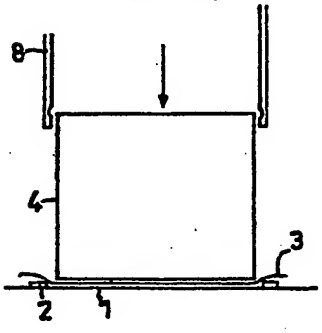


FIG. 6



July 2, 1963 J. W. SMITH 3,095,632

METHOD FOR CONTINUOUSLY OPENING CRIMPED TOW

Original Filed Nov. 7, 1957 4 Sheets-Sheet 1

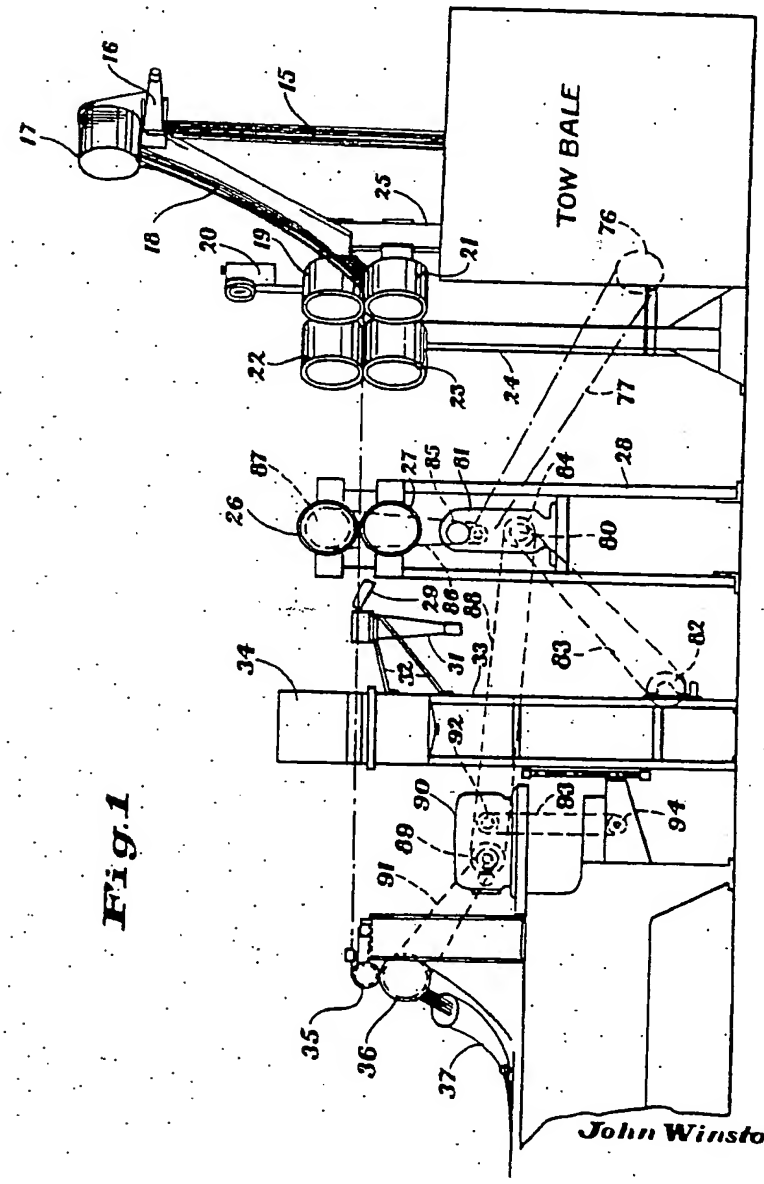


Fig. 1

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METHOD FOR CONTINUOUSLY OPENING CRIMPED TOW

Original Filed Nov. 7, 1957 4 Sheets-Sheet 2

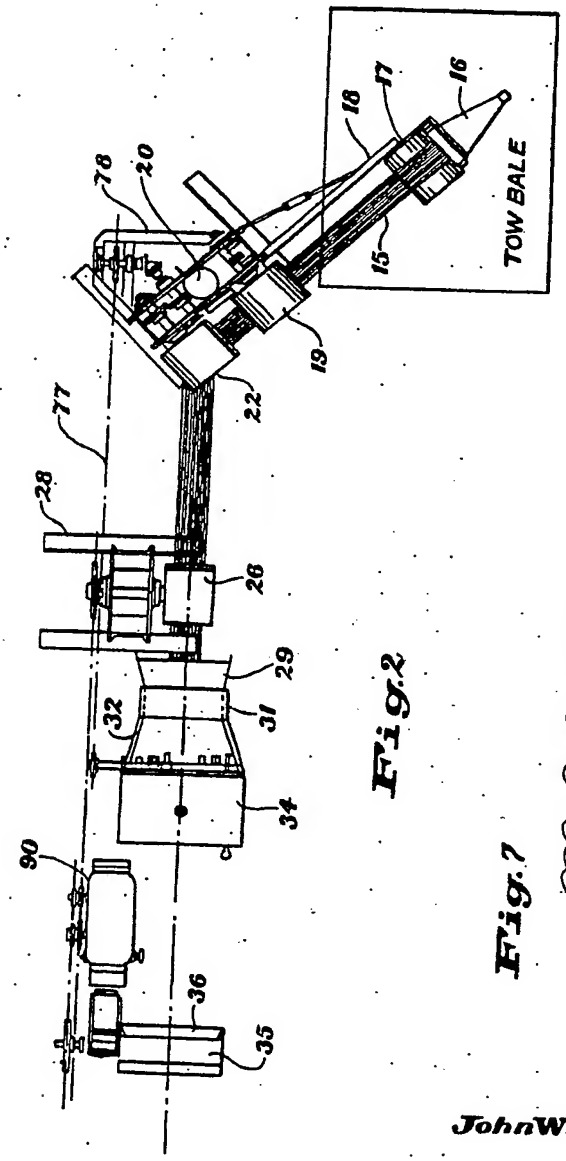

Fig. 2

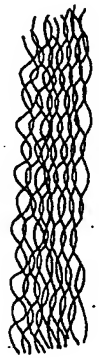

Fig. 7

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METHOD FOR CONTINUOUSLY OPENING CRIMPED TOW

Original Filed Nov. 7, 1957 4 Sheets-Sheet 3

Fig. 3

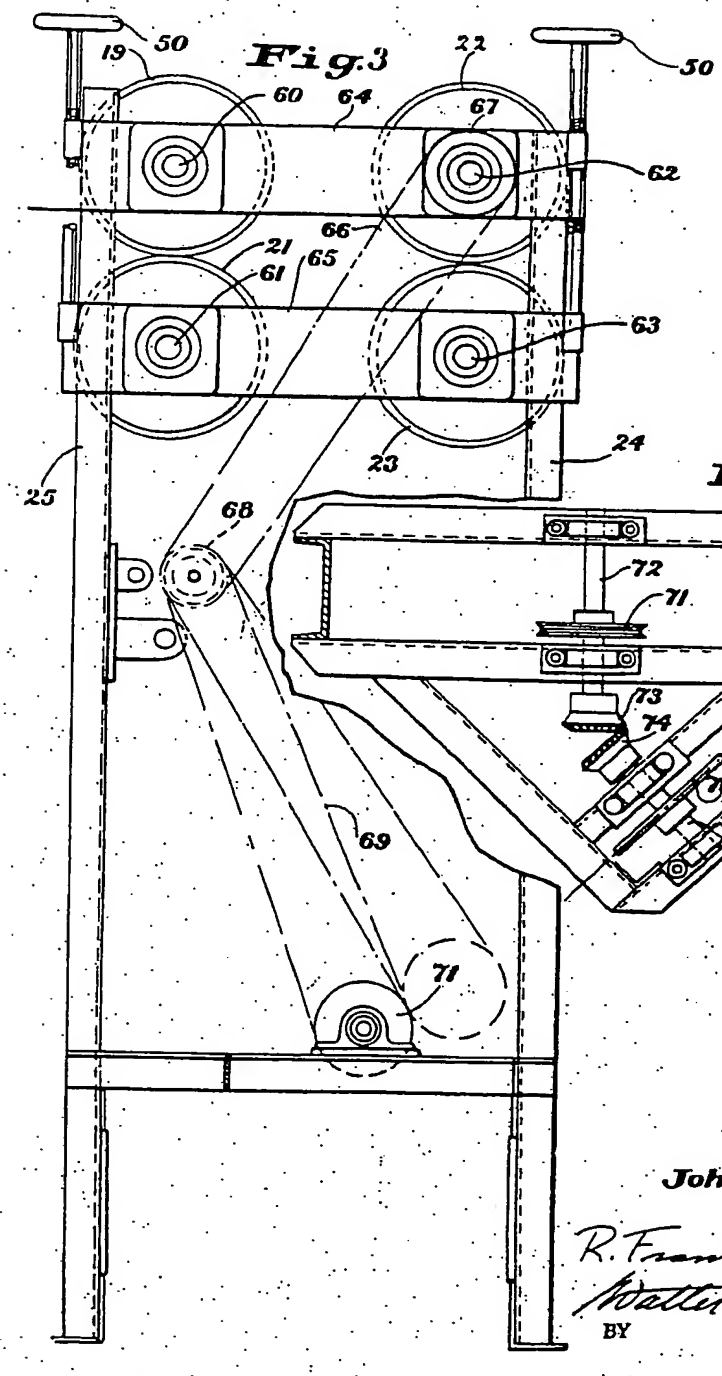

Fig. 4

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METHOD FOR CONTINUOUSLY OPENING CRIMPED TOW

Original Filed Nov. 7, 1957 4 Sheets-Sheet 4

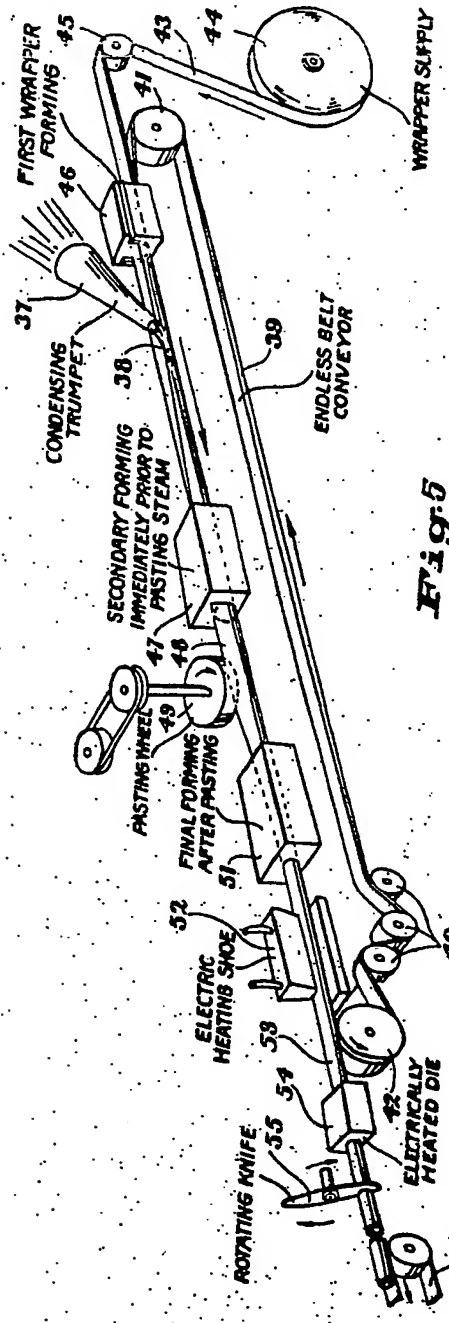


Fig. 5

Fig. 8

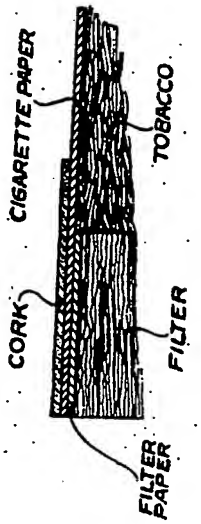
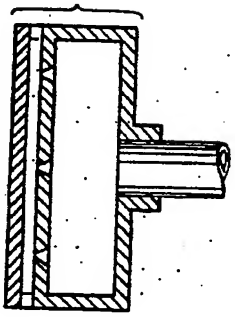


Fig. 6



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